

Quantitative determination of creatine kinase (CK)

CLS 431

Principle of the method

- Phosphocreatine + ADP $\xrightarrow{\text{CK}}$ creatine + ATP
- ATP + Glucose $\xrightarrow{\text{HK}}$ ADP + Glucose-6-phosphate
- G6P + NADP⁺ + H⁺ $\xrightarrow{\text{G6P-DH}}$ 6-Phosphogluconate + NADPH
- The rate of NADPH formation, measured photometrically, is proportional to the catalytic concentration of CK present in the sample.

Clinical significance

- Its physiological role is associated with ATP generation for contractile or transport systems.
- Its major function is predominantly active in muscles.
- Highest activity is present in skeletal muscle, heart, brain tissue.
- Lesser activity is seen in bladder, placenta, GIT, lung, liver and pancreas.

Clinical use

- Elevated CK values are observed in disorders of cardiac and skeletal muscles.
- Is regarded as the most sensitive indicator of acute myocardial infarction and of muscular dystrophy.

Sample

Serum or plasma

Procedure

- Wavelength 340nm.
- Cuvette 1cm. light path
- constant temperature 25°C.
- Pipette into a cuvette:

WR (ml)	1.0
Sample μl	25

- Mix, incubate for 2 minute.
- Read initial absorbance of the sample, start the the stopwach and read absorbances at 1 minute intervals thereafter for 3 minutes.
- Calculate the difference between absorbances and the average absorbance differences per minute ($\Delta A/\text{min}$)

Calculations

- $\Delta A/\text{min} \times 6592 = \text{U/L of CK}$

Reference values

- Men up to 80 U/L
- Women up to 70 U/L